State Board of Education Approved
February 2002

AUTOMOTIVE: SUSPENSION AND STEERING

COURSE DESCRIPTION

Automotive: Suspension and Steering is a course that prepares students for entry-level positions or advanced training in automotive suspension and steering systems. Course material covers the principles of automotive suspension/steering systems and four-wheel suspension alignment. Course content provides the student the opportunity to acquire marketable skills by training in wheel alignment and the testing, diagnosis, and repair of steering and suspension systems. Lab facilities and experiences simulate automotive service industry operations through the use of training aids and modules and school-based learning opportunities.

Course content prepares students for the Automotive Service Excellence (ASE) Suspension and Steering test.

Prerequisite(s): Transportation Core

Algebra I or Math for Technology II; Physical Science or Principles of Technology I (may be concurrent)

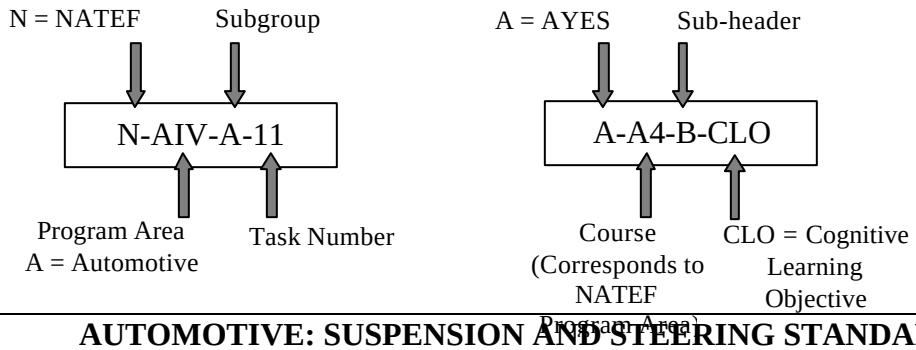
Requirement: A minimum of 100 hours must be dedicated to suspension and steering to meet minimum standards by NATEF.

Recommended Credits: 1

Recommended Grade Level(s): 10th, 11th, or 12th

Note: Course is aligned with NATEF task list for Automotive: Suspension and Steering. Items have been organized based on requirements of Tennessee required course description format.

Suspension and Steering



AUTOMOTIVE: SUSPENSION AND STEERING STANDARDS

1.0 Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

2.0 Students will demonstrate automotive technology safety practices, including Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) requirements for an automotive repair facility.

3.0 Students will apply fundamental science concepts to automotive suspension and steering systems technology.

4.0 Students will properly test, diagnose, service, and repair automotive steering systems.

5.0 Students will properly test, diagnose, service, and repair automotive front suspension systems.

6.0 Students will properly test, diagnose, service, and repair automotive rear suspension systems.

7.0 Students will use proper equipment and procedures to set front and rear wheel alignment angles.

8.0 Students will demonstrate communication skills required in the automotive service industry.

9.0 Students will demonstrate interpersonal and employability skills required in the automotive service industry.

AUTOMOTIVE: SUSPENSION AND STEERING

STANDARD 1.0

Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

LEARNING EXPECTATIONS

The student will:
1.1 Develop a plan for self-improvement.
1.2 Participate in SkillsUSA-VICA as an integral part of classroom instruction.
1.3 Assess client expectations.
1.4 Develop a working relationship with a mentor.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
1.1 Recognizes stress factors.
1.2.A Applies the points of the creed to personal and professional situations.
1.2.B Reviews professional journals and develops a 3 to 5 minute presentation.
1.3.A Develops a customer satisfaction card and implements a plan to gather information from responses.
1.4.A Develops a schedule to provide time to work with a mentor.
1.4.B Keeps a record of time and activities performed while working with a mentor.

SAMPLE PERFORMANCE TASKS

- Create a leadership inventory and use it to conduct a personal assessment to identify stress factors or sources.
- Participate in various SkillsUSA-VICA programs and/or competitive events.
- Measure and modify short-term goals.
- Implement an annual program of work.
- Identify a mentor and establish a relationship with the mentor. Develop a plan using time management skills to spend time with the mentor. Job shadow or internship experiences should be developed and recorded.

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AUTOMOTIVE: SUSPENSION AND STEERING

INTEGRATION LINKAGES

SkillsUSA-VICA, *Professional Development Program,* SkillsUSA-VICA, Communications and Writing Skills, Teambuilding Skills, Research, Language Arts, Sociology, Psychology, Math, Math for Technology, Applied Communications, Social Studies, Problem Solving, Interpersonal Skills, Employability Skills, Critical-Thinking Skills, SCANS (Secretary's Commission on Achieving Necessary Skills), Chamber of Commerce, Colleges, Universities, Technology Centers, and Employment Agencies

AUTOMOTIVE: SUSPENSION AND STEERING

STANDARD 2.0

Students will demonstrate automotive technology safety practices, including Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) requirements for an automotive repair facility.

LEARNING EXPECTATIONS

Students will:

2.1 Comply with personal and environmental safety practices.
2.2 Use protective clothing and safety equipment used in suspension and steering servicing.
2.3 Use fire protection equipment.
2.4 Follow OSHA and EPA regulations affecting suspension and steering service technology.
2.5 Respond to safety communications referring to suspension and steering issues.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

2.1.A Conforms to federal, state, and local regulations when handling, storing, and disposing of chemicals and parts.
2.1.B Ensures proper ventilation for chemical use.
2.1.C Performs work in a safe organized manner.
2.2.A Demonstrates proper usage of special safety equipment.
2.2.B Selects and uses the appropriate protective clothing for a given task.
2.2.C Demonstrates the use of eye protection.
2.3.A Distinguishes the proper fire extinguisher for each class of fire.
2.3.B Demonstrates the proper use of a fire extinguisher.
2.4.A Locates regulatory information.
2.4.B Extracts information from Material Safety Data Sheets.
2.4.C Complies with relevant regulations and standards.
2.4.D Passes with 100% accuracy a written examination relating specifically to suspension and steering safety issues.
2.4.E Passes with 100% accuracy a performance examination relating specifically to suspension and steering tools and equipment.
2.4.F Maintains a portfolio record of written safety examinations and equipment examinations for which the student has passed an operational checkout by the instructor.
2.5.A Interprets safety signs and symbols.
2.5.B Complies with safety signs and symbols.

SAMPLE PERFORMANCE TASKS

- Assess the work area for safety hazards.
- Design a corrections program for identified hazards.
- Model the appropriate protective equipment for an assigned task.

INTEGRATION LINKAGES

Math, Science, Communication Skills, Teamwork Skills, Reading and Writing Skills, Computer Skills, Internet Navigation Skills, Language Arts, Problem Solving and Critical Thinking Skills, Interpersonal and Employability Skills. Leadership Skills, Secretary's Commission on Achieving Necessary (SCANS), National Institute for Automotive Service Excellence (ASE), National Automotive Technician Education Foundation (NATEF), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), AYES Curriculum.

AUTOMOTIVE: SUSPENSION AND STEERING

STANDARD 3.0

Students will apply fundamental science concepts to automotive suspension and steering system technology.

LEARNING EXPECTATIONS

The student will:

3.1 Examine how physics concepts apply to automotive suspension and steering system operation.

3.2 Explore the application of fundamental laws of hydraulics to automotive suspension and steering systems.

3.3 Analyze the characteristics and properties of liquids as applied to automotive suspension and steering system technology.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

3.1.A Correlates the following concepts with their role in automotive suspension and steering systems:

- force
- friction
- inertia
- momentum
- speed
- work
- torque
- power
- lever
- gear ratios
- reduction
- overdrive

3.1.B Interprets Newton's laws of motion as applied to automotive steering and suspension systems. A-A4-1-CLO

3.2.A Interprets the laws of hydraulics as applied to the operation of non-rack and rack-and-pinion power steering gears. A-A4-1-CLO

3.2.B Interprets the laws of hydraulics as applied to the operation of a power steering pump.

3.3.A Assesses the characteristics of liquids. A-A4-1-CLO

3.3.B Determines the properties of power steering fluid. A-A4-1-CLO

SAMPLE PERFORMANCE TASKS

- Diagram a steering and suspension system, identifying the forces and principles at work in each point in the system.
- Illustrate the role of hydraulics in a power steering pump.

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INTEGRATION LINKAGES

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AUTOMOTIVE: SUSPENSION AND STEERING

STANDARD 4.0

Students will properly test, diagnose, service, and repair automotive steering systems.

LEARNING EXPECTATIONS

The student will:

4.1 Diagnose steering systems and determine necessary action.
4.2 Clean, inspect, reassemble, adjust, and install power and manual steering gear boxes.
4.3 Clean, inspect, reassemble, adjust, and install power and manual rack and pinion steering rack.
4.4 Inspect and repair steering columns.
4.5 Inspect and replace steering linkage components.
4.6 Inspect, repair, and replace power steering pumps.

PERFORMANCE STANDARDS EVIDENCE STANDARDS IS MET

The student:

4.1.A Diagnoses steering column noises, looseness, and binding concerns (including tilt mechanisms); determines necessary action. N-AIV-A-3
4.1.B Inspects steering shaft universal joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; performs necessary action. N-AIV-A-6
4.1.C Diagnoses power steering fluid leakage; determines necessary action. N-AIV-A-14
4.1.D Diagnoses and adjusts components of electronically controlled steering systems; determines necessary action. N-AIV-A-21
4.2.A Diagnoses power steering gear (non-rack-and-pinion) binding, uneven turning effort, looseness, hard steering and fluid leakage concerns; determines necessary action. N-AIV-A-4
4.2.B Adjusts manual or power non-rack-and-pinion worm bearing preload and sector lash. N-AIV-A-7
4.2.C Inspects power steering fluid levels and conditions. N-AIV-A-12
4.3.A Removes and replaces manual or power rack and pinion steering gear; inspects mounting bushings and brackets. N-AIV-A-8
4.3.B Disassembles, inspects, performs necessary action and reassembles rack and pinion steering gear. N-AIV-A-9
4.3.C Adjusts manual or power rack and pinion steering gear. N-AIV-A-10
4.3.D Inspects and replaces manual or power rack and pinion steering gear inner tie rod ends (sockets) and bellows boots. N-AIV-A-11
4.4.A Disables and enables supplemental restraint system (SRS) in accordance with manufacturer's procedures. N-AIV-A-1
4.4.B Removes and replaces steering wheel; center/time supplemental restraint system (SRS) coil in accordance with manufacturer's procedures. N-AIV-A-2

4.5.A Inspects and replaces pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper. N-AIV-A-19
4.5.B Inspects, replaces, and adjusts tie rod ends (sockets), tie rod sleeves, and clamps. N-AIV-A-20
4.6.A Flushes, fills, and bleeds power steering system. N-AIV-A-13
4.6.B Removes, inspects, replaces, and adjusts power steering pump belt. N-AIV-A-15
4.6.C Removes, inspects, and replaces power steering pump, mounts, seals, and gaskets. N-AIV-A-16
4.6.D Removes, inspects, and replaces power steering pump pulley; checks alignment. N-AIV-A-17
4.6.E Inspects and replaces power steering hoses and fittings. N-AIV-A-18

SAMPLE PERFORMANCE TASKS

- Remove and replace tie rod ends.
- Remove and replace power steering pump belt.
- Using case scenarios, follow strategy-based diagnostic procedure to verify the complaint, define the problem, isolate the problem, validate the problem, make the repair, and test the repair. Complete a repair order using technical writing skills and calculate salary earnings based on the repair order description and manufacture allowances for each item on the work order. Calculate manufacturer labor operation time used in the diagnostic process.

INTEGRATION LINKAGES

Math, Science, Communication Skills, Teamwork Skills, Reading and Writing Skills, Computer Skills, Internet Navigation Skills, Language Arts, Problem Solving and Critical Thinking Skills, Interpersonal and Employability Skills. Leadership Skills, Secretary's Commission on Achieving Necessary (SCANS), National Institute for Automotive Service Excellence (ASE), National Automotive Technician Education Foundation (NATEF), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), AYES Curriculum.

AUTOMOTIVE: SUSPENSION AND STEERING

STANDARD 5.0

Students will properly test, diagnose, service, and repair automotive front suspension systems.

LEARNING EXPECTATIONS

The student will:

5.1 Diagnose conventional and electronic front suspension systems and determine necessary action.
5.2 Inspect and repair control arm and spring assemblies on conventional systems.
5.3 Inspect and repair wheel spindles and bearings.
5.4 Inspect and replace shock absorbers and stabilizer bars.
5.5 Diagnose MacPherson strut assemblies and determine necessary action.
5.6 Clean, inspect, and assemble MacPherson strut assemblies.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

5.1.A Diagnoses short and long arm suspension system noises, body sway, and uneven riding height concerns; determines necessary action. N-AVI-B-1.1
5.1.B Inspects, removes, and replaces shock absorbers. N-AVI-B-3.1
5.1.C Diagnoses, inspects, adjusts, and repairs or replaces components of electronically controlled suspension systems. N-AVI-B-3.3
5.2.A Lubricates suspension and steering systems. N-AVI-B-1.11
5.2.B Removes, inspects, and installs upper and lower control arms, bushings, shafts, and rebound bumpers. N-AVI-B-1.3
5.2.C Removes, inspects, installs, and adjusts strut (compression/tension) rods and bushings. N-AVI-B-1.4
5.2.D Removes, inspects, and installs the following:

- upper and lower ball joints on short and long arm suspension systems, . N-AVI-B-1.5
- steering knuckle assemblies, . N-AVI-B-1.6 and
- short and long arm suspensions system coil springs and spring insulators. N-AVI-B-1.7

5.2.E Removes, inspects, installs, and adjusts suspension system torsion bars; inspects mounts. N-AVI-B-1.8
5.3.A Removes, inspects, and services or replaces front and rear wheel bearings. N-AVI-B-2.2
5.3.B Removes, inspects, and services or replaces wheel spindles
5.4 Removes, inspects, and installs stabilizer bar bushings, brackets, and links. N-AVI-B-1.9
5.5 Diagnoses MacPherson strut suspension system noises, body sway, and uneven riding height concerns; determines necessary action. N-AVI-B-1.2
5.6 Removes, inspects, and installs MacPherson strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount. N-AVI-B-1.10

SAMPLE PERFORMANCE TASKS

- Remove a control arm and install bushings.
- Remove a MacPherson strut and replace.
- Using case scenarios follow strategy based diagnostic procedure to verify the complaint, define the problem, isolate the problem, validate the problem, make the repair, and test the repair. Complete a repair order using technical writing skills and calculate salary earnings based on the repair order description and manufacture allowances for each item on the work order. Calculate manufacturer labor operation time used in the diagnostic process.
- Diagnose vehicle wander, drift, pull, hard steering, bump steering, memory steer, torque steer, and steering return concerns; determine the problems and make necessary corrections.

INTEGRATION LINKAGES

Math, Science, Communication Skills, Teamwork Skills, Reading and Writing Skills, Computer Skills, Internet Navigation Skills, Language Arts, Problem Solving and Critical Thinking Skills, Interpersonal and Employability Skills. Leadership Skills, Secretary's Commission on Achieving Necessary (SCANS), National Institute for Automotive Service Excellence (ASE), National Automotive Technician Education Foundation (NATEF), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), AYES Curriculum.

AUTOMOTIVE: SUSPENSION AND STEERING

STANDARD 6.0

Students will properly test, diagnose, service, and repair automotive rear suspension systems.

LEARNING EXPECTATIONS

The student will:

6.1 Inspect and diagnose conventional and electronic rear suspension systems and components and determine necessary action.

6.2 Repair or replace rear suspension system components.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student

6.1.A Completes strategy based diagnostic procedure to verify the complaint, define the problem, isolate the problem, validate the problem, make the repair, and test the repair pertaining to rear suspension systems.

6.1.B Removes and inspects the following:

- coil springs and spring insulators; N-AIV-B-2.1
- leaf springs, leaf spring insulators (silencers), shackles, brackets, bushings, and mounts; N-AIV-B-2.3
- front and rear wheel bearings; N-AIV-B-3.2
- shock absorbers; N-AIV-B-3.1
- MacPherson strut cartridge or assembly, strut coil spring, and insulators (silencers); N-AIV-B-2.4 and
- transverse links, control arms, bushings, and mounts. N-AIV-B-2.2

6.1.C Diagnoses and inspects components of electronically controlled suspension systems. N-AIV-B-3.3

6.2.A Installs the following:

- coil springs and spring insulators; N-AIV-B-2.1
- leaf springs, leaf spring insulators (silencers), shackles, brackets, bushings, and mounts; N-AIV-B-2.3
- shock absorbers; N-AIV-B-3.1
- MacPherson strut cartridge or assembly, strut coil spring, and insulators (silencers) N-AIV-B-2.4; and
- transverse links, control arms, bushings, and mounts. N-AIV-B-2.2

6.2.B Services or replaces front and rear wheel bearings. N-AIV-B-3.2

6.2.C Adjusts and repairs or replaces components of electronically controlled suspension systems. N-AIV-B-3.3

SAMPLE PERFORMANCE TASKS

- Remove and replace rear shock absorbers.

- Replace rear wheel bearings.

INTEGRATION LINKAGES

Math, Science, Communication Skills, Teamwork Skills, Reading and Writing Skills, Computer Skills, Internet Navigation Skills, Language Arts, Problem Solving and Critical Thinking Skills, Interpersonal and Employability Skills. Leadership Skills, Secretary's Commission on Achieving Necessary (SCANS), National Institute for Automotive Service Excellence (ASE), National Automotive Technician Education Foundation (NATEF), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), AYES Curriculum.

AUTOMOTIVE: SUSPENSION AND STEERING

STANDARD 7.0

Students will use proper equipment and procedures to set front and rear wheel alignment angles.

LEARNING EXPECTATIONS

The student will:
7.1 Diagnose steering and tire wear problems and determine necessary action.
7.2 Set correct alignment angles on front wheels.
7.3 Set correct camber and toe on real wheels.
7.4 Rotate and balance tire and wheel assemblies.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
7.1.A Diagnoses short and long arm suspension system noises, body sway, and uneven riding height concerns; determines necessary action.
7.1.B Diagnoses MacPherson strut suspension system noises, body sway, and uneven riding height concerns; determine necessary action.
7.1.C Removes, inspects, and installs leaf springs, leaf spring insulators (silencers), shackles, brackets, bushings, and mounts.
7.1.D Diagnoses vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns. N-AIV-C-1
7.1.E Diagnoses tire-pull (lead) problem; determines necessary action. N-AIV-D-6
7.1.F Completes strategy based diagnostic procedure to verify the complaint, define the problem, isolate the problem, validate the problem, make the repair, and test the repair pertaining to rear wheel alignment. N-AIV-
7.2.A Performs pre-alignment inspection; performs necessary action. N-AIV-C-2
7.2.B Measures vehicle riding height; determines necessary action. N-AIV-C-3
7.2.C Checks and adjusts front and rear wheel camber; performs necessary action. N-AIV-C-4
7.2.D Checks the following and determines necessary action:
- front cradle (sub-frame) alignment, N-AIV-C-13
- turning radius, N-AIV-C-8
- SAI (steering axis inclination) and include angle, N-AIV-C-9 and
- for front wheel setback. N-AIV-C-12

7.2.E Checks front wheel toe and adjusts as needed. N-AIV-C-6
7.2.F Centers steering wheel. N-AIV-C-7
7.3.A Checks and adjusts caster; performs necessary action. N-AIV-C-5
7.3.B Checks and adjusts rear wheel toe. N-AIV-C-10
7.3.C Checks rear wheel thrust angle; determines necessary action. N-AIV-C-11
7.4.A Diagnoses the following and determines necessary action:
- tire wear patterns, N-AIV-D-1
- wheel/tire vibration, shimmy, and noise. N-AIV-D-3

7.4.B Inspects tires; checks and adjusts air pressure. N-AIV-D-2
7.4.C Rotates tires according to manufacturer's recommendations. N-AIV-D-5
7.4.D Measures wheel, tire, axle, and hub runout; determines necessary action
7.4.E Balances wheel and tire assembly (static and dynamic). N-AIV-D-7
7.4.F Dismounts, inspects, repairs, and remounts tire on wheel; reinstalls wheel and torques lug nuts to manufacturer specifications. N-AIV-D-8, N-AIV-D-9

SAMPLE PERFORMANCE TASKS

- Adjust vehicle ride height.
- Check and adjust front wheel toe.
- Check tire air pressure and adjust as needed.

INTEGRATION LINKAGES

Math, Science, Communication Skills, Teamwork Skills, Reading and Writing Skills, Computer Skills, Internet Navigation Skills, Language Arts, Problem Solving and Critical Thinking Skills, Interpersonal and Employability Skills. Leadership Skills, Secretary's Commission on Achieving Necessary (SCANS), National Institute for Automotive Service Excellence (ASE), National Automotive Technician Education Foundation (NATEF), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), AYES Curriculum.

AUTOMOTIVE: SUSPENSION AND STEERING

STANDARD 8.0

Students will demonstrate communication skills required in the automotive service industry.

LEARNING EXPECTATIONS

The student will:

8.1 Communicate and comprehend oral and written information typically occurring in automotive suspension and steering diagnosis and repair.
8.2 Solve suspension and steering problems and make decisions using a logical process.
8.3 Use teamwork skills to accomplish goals, solve problems, and manage conflict within groups.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

8.1.A Interprets and uses written information in common job formats, such as tables, charts, and reference materials and manuals pertaining to suspension and steering systems.
8.1.B Interprets and uses graphical information such as blueprints, electrical schematics, process control schematics, automotive flow charts, and other automotive diagrams related to suspension and steering.
8.1.C Uses electronic resources to obtain service and other automotive information.
8.1.D Analyzes information obtained from various sources to determine a diagnostic approach.
8.1.E Communicates clearly and appropriately in oral and written form.
8.1.F Interprets an automotive repair order.
8.2.A Develops a hypothesis regarding the cause of a suspension and steering problem.
8.2.B Tests the hypothesis to determine the solution to the suspension and steering problem.
8.2.C Creates, evaluates, and revises as needed a plan to resolve a problem.
8.2.D Completes strategy based diagnostic procedure to verify the complaint, define the problem, isolate the problem, validate the problem, make the repair, and test the repair pertaining to suspension and steering systems.
8.3.A Serves in each of the functional roles of a team performing suspension and steering services.
8.3.B Contrasts ethical and unethical workplace behaviors.
8.3.C Demonstrates appropriate and positive examples of giving and accepting criticism.
8.3.D Modifies behavior or revises work based on appropriate criticism.
8.3.E Manages a team and evaluates others.
8.3.F Evaluates the role of the repair team within the organizational system of a dealership or fleet shop.

SAMPLE PERFORMANCE TASKS

- Complete an automotive repair order.
- Use reference materials to determine procedures for diagnosing and testing suspension and steering systems.
- Work as a team member to develop a diagnostic strategy.
- Use blueprints and diagrams to execute a task.

INTEGRATION LINKAGES

Math, Science, Communication Skills, Teamwork Skills, Reading and Writing Skills, Computer Skills, Internet Navigation Skills, Language Arts, Problem Solving and Critical Thinking Skills, Interpersonal and Employability Skills. Leadership Skills, Secretary's Commission on Achieving Necessary (SCANS), National Institute for Automotive Service Excellence (ASE), National Automotive Technician Education Foundation (NATEF), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), AYES Curriculum.

AUTOMOTIVE: SUSPENSION AND STEERING

STANDARD 9.0

Students will demonstrate interpersonal and employability skills required in the automotive services industry.

LEARNING EXPECTATIONS

The student will:

9.1 Infer relationships between work ethics and organizational and personal job success.
9.2 Develops customer service skills.
9.3 Maintain a neat and orderly work area.
9.4 Assess implications of diversity for communities and workplaces.
9.5 Explore supervisory and management roles in the dealership or fleetshop.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

9.1.A Assesses the potential impact of an individual's positive work ethic and an individual's negative work ethic on an organizational system.
9.1.B Infers the relationship between work ethics and personal job success.
9.2.A Maximizes customer service opportunities.
9.2.B Demonstrates improvement in customer service skills.
9.3.A Keeps work area and tools organized and free from clutter.
9.3.B Cleans work area and suspension and steering related equipment according to NATEF and EPA standards.
9.3.C Deduces the correlation between a clean orderly work environment and successful and efficient job performance.
9.4.A Points out benefits and problems that may arise from diversity in suspension and steering in various manufacturers.
9.4.B Engages in a team negotiation activity.
9.5.A Determines personal proficiency in employability behavior competencies.
9.5.B Demonstrates personal proficiency in management skill competencies.
9.5.C Assesses the benefits of incorporating time management principles into work in the automotive service industry.

SAMPLE PERFORMANCE TASKS

- Maintain an orderly work area.
- Lead a problem-solving team.
- Consistently arrive at class on time.
- Participate in an internship in a dealership.
- Resolve an interpersonal conflict in the classroom.
- Manage a project and evaluate yourself as a leader and evaluate other team members.

INTEGRATION LINKAGES

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AUTOMOTIVE: SUSPENSION AND STEERING

SAMPLING OF AVAILABLE RESOURCES

A4 Automotive Steering and Suspension Course, AYES Curriculum, AYES Corporation, www.ayes.org

A4 Steering and Suspension Systems, CD-ROM, Interactive Computer Based Training, DVP/CDX 1-888-873-2239

Curriculum Integrator, CORD Communications, Waco, Texas 1998

Module 5 Steering and Suspension Systems, Instructional Materials Laboratory(IML), University of Missouri

Today's Technician Automotive Steering and Suspension, 2nd Edition, Knowles, Delmar Publishing

1999 Automobile Task List, National Automotive Technicians Education Foundation (NATEF), www.natef.org